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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/762,031  | 01/21/2004  | Wang Yueh            | ITL.1074US (P18216) | 3943             |
| 21906   | 7590        | 08/09/2005           | EXAMINER            |                  |
| TROP PRUNER & HU, PC<br>8554 KATY FREEWAY<br>SUITE 100<br>HOUSTON, TX 77024 |             |                      | CHU, JOHN S Y       |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 1752                |                  |

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/762,031

Applicant(s)

YUEH

Examiner

John S. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 May 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

This Office action is in response to the response filed May 20, 2005.

1. The rejection under 35 U.S.C. 102(b) as being clearly anticipated by ROESCHERT et al (5,302,488) is **withdrawn** in view of the amendment to claim 1 now requiring the exposure to EUV.
2. The rejection under 35 U.S.C. 102(b) as being clearly anticipated by ROESCHERT et al (5,326,826) is **withdrawn** in view of the amendment to claim 1 now requiring the exposure to EUV.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over WEST et al (5,705,308) in view of FEDYNSHYN (6,783,914)

The claimed invention is drawn to the following:

1 (Currently Amended). A method comprising:  
forming a photoresist by attaching a photoactive compound including diazonaphthoquinone to a polymer backbone; and  
exposing said photoresist to extreme ultraviolet radiation.

WEST et al '308 discloses an photosensitive composition comprising a diazonaphthoquinone compound attached to poly(4-hydroxystyrene) for use in preparing

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lithographic printing plates, see Example 5 in column 8, line 65 – column 9, line 7. Here a conventionally positive working composition is processed in a manner to give a negative image wherein the composition is imagewise exposed to diode laser and subsequently flood exposed with UV to give a negative pattern (areas exposed to the diode laser remain after development, which means a negative image is formed). The claimed method lacks the exposure step with EUV.

FEDYN SHYN discloses an encapsulate inorganic resist composition wherein he discloses that the photosensitive compositions of the invention are sensitive to the various radiation sources to include g-line, i-line, 248 nm, 193 nm and EUV, see column 3, lines 15-20 and the image below:

**The photosensitive resist compositions of the invention<sup>1</sup> are sensitive to conventional 455 nm (g-line), 405 nm (h-line), or 365 nm (i-line) steppers; at either 248 or 193 nm due to decreased resist absorbance; and/or sensitive to imaging sources such as 157 nm, EUV, e-beam, x-ray, ion beam, and other sub-200 nm wavelengths.**

such that the exposure sources are functionally equivalent and can be interchangeably used to expose a photosensitive resist composition along with the modifications conventionally known in the art.

It would have been *prima facie* obvious to one of ordinary skill in the art of positive photoresist composition comprising an NQD to expose the photoresist of WEST et al '308 imagewise to EUV as taught in column 3, lines 15-20 of FEDYN SHYN and reasonably expect same or similar results as recited for increased plasma etch selectivity compared to conventional resists.

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5. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over OBERLANDER et al (5,866,295), McCULLOUGH et al (6,218,083) or ISHIZUKA et al (6,824,947) in view of FEDYNSHYN (6,783,914).

The claimed invention has been recited above and is included by reference.

Each of the cited references in the current rejection disclose a photosensitive composition comprising a teaching which suggests to the skilled artisan the use of a polymer having a diazonaphthoquinone photoactive group chemically attached to a polymer backbone, see column 5, lines 46-48 in OBERLANDER et al '295, see column 5, lines 28-30 in McCULLOUGH et al '083 and see column 11, lines 52-56 in ISHIZUKA et al '947.

Each of the reference cited above lack the use of a polymer having a photoactive group attached at the backbone in a working example as well as exposing the photoresist to EUV.

FEDYNSHYN discloses an encapsulate inorganic resist composition wherein he discloses that the photosensitive compositions of the invention are sensitive to the various radiation sources to include g-line, i-line, 248 nm, 193 nm and EUV, see column 3, lines 15-20 and the image below:

**The photosensitive resist compositions of the invention<sup>1</sup> are sensitive to conventional 455 nm (g-line), 405 nm (h-line), or 365 nm (i-line) steppers; at either 248 or 193 nm due to decreased resist absorbance; and/or sensitive to imaging sources such as 157 nm, EUV, e-beam, x-ray, ion beam, and other sub-200 nm wavelengths.**

such that the exposure sources are functionally equivalent and can be interchangeably used to expose a photosensitive resist composition along with the modifications conventionally known in the art.

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It would have been *prima facie* obvious to one of ordinary skill in the art of positive photoresist composition comprising an NQD to 1) select as the photoactive component a ballast compound of OBERLANDER et al having a quinonediazide photosensitive group attached to a polymer backbone of poly(4-hydroxystyrene), 2) select as the photoactive component a naphthoquinone diazide ester of poly(p-hydroxystyrene) of McCULLOUGH et al or 3) select the homopolymer or copolymer of p-hydroxystyrene esterified with 1,2-naphthoquinone-2-diazide-5-sulfonyl chloride with the reasonable expectation of same or similar results as recited in those references for superior wear resistance, high sensitivity and having wide exposure latitude and it would have been *prima facie* obvious to the skilled artisan to expose the photoresist imagewise to EUV as taught in column 3, lines 15-20 of FEDYNSHYN and reasonably expect same or similar results as recited for increased plasma etch selectivity compared to conventional resists.

6. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over FEDYNSHYN.

The claimed invention has been recited above and is included by reference.

FEDYNSHYN discloses an encapsulate inorganic resist composition wherein he discloses that the photosensitive compositions of the invention are sensitive to the various radiation sources to include g-line, i-line, 248 nm, 193 nm and EUV, see column 3, lines 15-20 and the image below:

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The photosensitive resist compositions of the invention are sensitive to conventional 455 nm (g-line), 405 nm (h-line), or 365 nm (i-line) steppers; at either 248 or 193 nm due to decreased resist absorbance; and/or sensitive to imaging sources such as 157 nm, EUV, e-beam, x-ray, ion beam, and other sub-200 nm wavelengths.

Applicants are further directed to column 6, lines 28 – 49 wherein the photolabile dispersants are disclosed to be in the encapsulate inorganic resist composition and are polymers modified with diazonaphthoquinone (DNQ). Here the disclosure meets the recited language for a photoactive compound with an attached diazonaphthoquinone compound on the polymer backbone.

The method in FEDYNSHYN lacks the use of EUV in a working example, however does teach the use of deep UV and e-beam as the radiation source as seen in column 27, line 63 – column 31, line 51. The example further lacks the use of a particle having a diazonaphthoquinone modified on the polymer.

It would have been *prima facie* obvious to one of ordinary skill in the art of photoresist processing to expose a photoresist comprising a polymer particle modified with a diazonaphthoquinone as motivate in column 6, lines 28-49 and expose the photoresist imagewise to EUV as taught in column 3, lines 15-20 and reasonably expect same or similar results as recited for increased plasma etch selectivity compared to conventional resists.

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Chu whose telephone number is (571) 272-1329. The examiner can normally be reached on Monday - Friday from 9:30 am to 6:00 pm.

The fax phone number for the USPTO is (703) 872-9306. **On July 15, 2005 applicants should begin sending correspondence to the new USPTO Central fax phone number at 571-273-8300. Applicants can still use the old fax number until September 15, 2005 at which time the old fax number will no longer be operational.**

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1700.

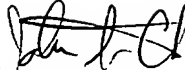
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PMR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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A handwritten signature in black ink, appearing to read "John S. Chu", is written over a horizontal line.

John S. Chu

Primary Examiner, Group 1700

J.Chu

August 7, 2005